

THE NIEHS/EPA CHILDREN'S ENVIRONMENTAL HEALTH AND DISEASE PREVENTION RESEARCH CENTERS: MORE THAN A DECADE OF INNOVATIVE RESEARCH ON IMPORTANT CHALLENGES IN ENVIRONMENTAL EPIDEMIOLOGY

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Background and Aims: The US Environmental Protection Agency (EPA) and the National Institute of Environmental Health Sciences (NIEHS) have supported the Children's Environmental Health and Disease Prevention Research Centers (Children's Centers) program since 1998, forming a successful and collaborative research network.

Methods: These multidisciplinary, translational research centers are investigating the role of environmental exposures such as air pollutants from traffic, pesticides, endocrine disruptors and social factors in adverse birth and health outcomes including asthma, autism, developmental delay and childhood leukemia and are using approaches such as epigenetics to find novel biomarkers of exposure, early developmental and pubertal effects. Community engagement is an important part of the program.

Results: Findings include: (1) Higher levels of organophosphate (OP) pesticide metabolites in mothers' urine during pregnancy are associated with attention problems in children; (2) Children with certain polymorphisms in the PON1 gene may be at higher risk from exposure to OPs; (3) Children with high prenatal exposure to PAHs from traffic-related air pollution had lower cognitive development tests at age 3 and lower IQ scores at age 5; (4) Research shows an association between increased prenatal LMW phthalates and poorer parental rating of childhood behavioral domains; (5) Children living within 75 meters of a major roadway have an increased risk of developing asthma; (6) variation in several genes in the nitric oxide (NO) synthesis and inflammatory pathways are associated with exhaled NO and asthma and children with variants of glutathione regulation genes may be protected from increased asthma risk; (7) Children with autism have a high incidence of mitochondrial dysfunction, which may affect developing brain cells.

Conclusion: Research from the NIEHS/EPA Children's Centers program is having a significant impact on the field of children's environmental health and provides a foundation for studies such as the US National Children's Study.